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10/617,810	07/14/2003	Tatsuya Sato	116580	4172

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/617,810	SATO ET AL.	
	Examiner	Art Unit	
	Negussie Worku	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07/15/03* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Attachment*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action is a response to application filed on 7/14/03, in which claims 1 through 22 are pending, and a preliminary amendment field on 8/15/03 has canceled claim 24.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 10/24/06, 07/13/06, 05, 16/06, 05/16/03 and 08/15/03, have been reviewed. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner is considering the information disclosure statement.

Claim Objections to minor informalities

4. A preliminary amendment field on 8/15/03 has canceled claim 24, the subject matter of the cancelled claim should not be submitted, and only need to show is that "claim 24 is cancelled". Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yushiyu (USP 6,539,129) in view of Yumiba et al. (USP 5, 483, 359).

With respect to claim 1, Yoshiya teaches an image sensor (image sensor as shown in fig 6) comprising: a plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) arranged in a main scanning direction, (col.5, lines 20-30) each of the plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) generating an analog image signal corresponding to an amount of incident light thereon, (analog digital conversion is generated by A/D 41-1 through 41-15 the, which ia a plurality of conversion element) plurality of photoelectric conversion elements (plurality of A/D conversion element 41-1-41-15 of fig 6) being divided into plural groups, each of the plural groups including a predetermined number (N) of the photoelectric conversion elements (the conversion elements are predetermined in a number group elements, A/D conversion element 41-1-41-15 of fig 6);

a plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) connected to respective ones of the plurality of photoelectric conversion elements, (col.4, lines 57-65) individually; and

a control unit (control signal generation circuit 44 of fig 7, serves as a driving means for generating each of the control signal, col.5, lines 12-15) that controls the plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) in response to an external clock signal (a master clock pulse signal MCLK, col.5, lines 12-16) to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, (various line sensor 2-1, 2-2.., and 2-15, simultaneously stars the operation, to out put image signal, as discussed in col.5, lines 21-25).

Although Yushiya teaches how a control unit 44 of fig 7, generate a control signal to control a switching elements in response to external signal clock signal, as shown in 6, and as discussed above), Yushiya fails to teach a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

Yumiba et al. (359), in the same area of image scanning apparatus, (as shown in fig 1) teaches a control unit (correction circuit 9 of fig 1) that controls the plurality of image sensor (R, G, B sensor 5a, 5b and 5c of fig 2) switching elements to simultaneously output the image signals from the predetermined number of photoelectric conversion elements (R, G, B sensor 5a, 5b and 5c of fig 2) in one of the

plural groups (plurality of image sensor 5a, 5b, 5c, r, g, b signals simultaneously output from sensors the RGB sensor corresponds to the different lines 1a, 1b and 1c of the original, col.4, lines 25-30).

Therefore, it would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified the imaging apparatus of Yushiya (129) to include: a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

It would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified imaging device of Yushiya by the teaching of Yumiba et al. (359) for the purpose of obtaining a perfect final image, for all the prints of different color to be exactly superimposed by controlling the output of plurality image sensors (RGB colors) at same time, instead of sequentially which affect the quality of the outputted image due to noise crated by each image sensor during lengthy operation.

With respect to claim 2, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising signal output lines with a number equal to N, wherein the predetermined number of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) in each of the plural groups are connectable with the respective ones of the signal output lines through the switching elements, elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) individually, to output the image signals from the

predetermined number of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) to the corresponding signal output line).

With respect to claim 3, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising an amplifier (42-1 of fig 6) connected to each of the signal output lines, the amplifier amplifying the image signal received from the respective one of the photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) through the corresponding one of the switching elements (43-1, 43-2 of fig 6).

With respect to claim 4, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising a multiplexer provided subsequent to the amplifier, the multiplexer multiplexing the image signal, which is transmitted from each of the photoelectric conversion elements (41-1, 41-2, .., of fig 6), and then amplified by the amplifiers (42-1 of fig 6).

With respect to claim 5, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising a multiplexer (42-1 of fig 6) connected to each of the signal output lines, the multiplexer multiplexing the image signal which is transmitted from each of the photoelectric conversion elements, (41-1, 41-2, .., of fig 6),

With respect to claim 6, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising an amplifier (42 of fig 6) that amplifies the image signal, which is transmitted from one of the photoelectric conversion elements (41-1, 41-2, of fig 6), and then multiplexed by the multiplexer (42-1 of fig 6).

With respect to claim 7, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising a sample-and-hold circuit (S/H circuit 45-1, 45-2 of fig 9) provided prior to the multiplexer (42-1 of fig 6) that temporarily stores the image signal received from each of the photoelectric conversion elements, (41-1, 41-2 of fig 6).

With respect to claim 8, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising a sample-and-hold circuit (S/H circuit 45-1, 45-2 of fig 9) provided prior to the multiplexer (memory 42-1 of fig 6) that temporarily stores the image signal transmitted from one of the photoelectric conversion elements (41-1, 41-2, of fig 6).

With respect to claim 9, Yoshiya teaches an image sensor (image sensor as shown in fig 6) comprising: a plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) arranged in a main scanning direction, (col.5, lines 20-30) each of the plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) generating an analog image signal corresponding to an amount of incident light thereon, (analog digital conversion is generated by A/D

41-1 through 41-15 the, which is a plurality of conversion element) plurality of photoelectric conversion elements (plurality of A/D conversion element 41-1-41-15 of fig 6) being divided into plural groups, each of the plural groups including a predetermined number (N) of the photoelectric conversion elements (the conversion elements are predetermined in a number group elements, A/D conversion element 41-1-41-15 of fig 6); a plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) connected to respective ones of the plurality of photoelectric conversion elements, (col.4, lines 57-65) individually; and

a control unit (control signal generation circuit 44 of fig 7, serves as a driving means for generating each of the control signal, col.5, lines 12-15) that controls the plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) in response to an external clock signal (a master clock pulse signal MCLK, col.5, lines 12-16) to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, (various line sensor 2-1, 2-2.., and 2-15, simultaneously stars the operation, to out put image signal, as discussed in col.5, lines 21-25),

and signal output lines with a number equal to N, wherein the predetermined number of photoelectric conversion elements (plurality image sensor (various line sensor 2-1, 2-2.., and 2-15, as discussed in col.5, lines 21-25), in each of the plural groups are connectable with the respective ones of the signal output lines through the switching elements, (switch elements 43-1, 43-2, .., and 43-15, col.5, lines 5-10) individually, to output the image signals from the predetermined number of photoelectric

conversion elements (various line sensor 2-1, 2-2.., and 2-15, to out put image signal, as discussed in col.5, lines 20-26), to the signal output lines; a multiplexer (circuit 44 of fig 6) connected to the signal output lines of the image sensor(sensor 2-1, 2-2.., and 2-15 of fig 6), for multiplexing the image signals transferred through the signal output lines; and an analog-to-digital converter (A/D conversion element 41-1-41-15 of fig 6) for converting the image signal that is multiplexed by the multiplexer (43-2 of fig 5) into a digital signal (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal)

Although Yushiya teaches how a control unit 44 of fig 7, generate a control signal to control a switching elements in response to external signal clock signal, as shown in 6, and as discussed above), Yushiya fails to teach a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

Yumiba et al. (359), in the same area of image scanning apparatus, (as shown in fig 1) teaches a control unit (correction circuit 9 of fig 1) that controls the plurality of image sensor (R, G, B sensor 5a, 5b and 5c of fig 2) switching elements to simultaneously output the image signals from the predetermined number of photoelectric conversion elements (R, G, B sensor 5a, 5b and 5c of fig 2) in one of the plural groups (plurality of image sensor 5a, 5b, 5c, r, g, b signals simultaneously output from sensors the RGB sensor corresponds to the different lines 1a, 1b and 1c of the original, col.4, lines 25-30).

Therefore, it would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified the imaging apparatus of Yushiya (129) to include: a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

It would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified imaging device of Yushiya by the teaching of Yumiba et al. (359) for the purpose of obtaining a perfect final image, for all the prints of different color to be exactly superimposed by controlling the output of plurality image sensors (RGB colors) at same time, instead of sequentially which affect the quality of the outputted image due to noise crated by each image sensor during lengthy operation.

With respect to claim 10, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising a plurality of analog amplifiers (42-1, 42-2 of fig 6) connected with the respective ones of the signal output lines, individually, for amplifying the image signal received from each of the photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) through the corresponding switching elements (42-1, 43-2 of fig 7).

With respect to claim 11, Yoshiya teaches an image sensor (image sensor as shown in fig 6) comprising: a plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6)

arranged in a main scanning direction, (col.5, lines 20-30) each of the plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) generating an analog image signal corresponding to an amount of incident light thereon, (analog digital conversion is generated by A/D 41-1 through 41-15 the, which is a plurality of conversion element) plurality of photoelectric conversion elements (plurality of A/D conversion element 41-1-41-15 of fig 6) being divided into plural groups, each of the plural groups including a predetermined number (N) of the photoelectric conversion elements (the conversion elements are predetermined in a number group elements, A/D conversion element 41-1-41-15 of fig 6); a plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) connected to respective ones of the plurality of photoelectric conversion elements, (col.4, lines 57-65) individually; and

a control unit (control signal generation circuit 44 of fig 7, serves as a driving means for generating each of the control signal, col.5, lines 12-15) that controls the plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) in response to an external clock signal (a master clock pulse signal MCLK, col.5, lines 12-16) to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, (various line sensor 2-1, 2-2.., and 2-15, simultaneously stars the operation, to out put image signal, as discussed in col.5, lines 21-25),

and signal output lines with a number equal to N, wherein the predetermined number of photoelectric conversion elements (plurality image sensor (various line

sensor 2-1, 2-2.., and 2-15, as discussed in col.5, lines 21-25), in each of the plural groups are connectable with the respective ones of the signal output lines through the switching elements, (switch elements 43-1, 43-2, .., and 43-15, col.5, lines 5-10) individually, to output the image signals from the predetermined number of photoelectric conversion elements (various line sensor 2-1, 2-2.., and 2-15, to out put image signal, as discussed in col.5, lines 20-26), to the signal output lines; a multiplexer (circuit 44 of fig 6) connected to the signal output lines of the image sensor(sensor 2-1, 2-2.., and 2-15 of fig 6), for multiplexing the image signals transferred through the signal output lines; and an analog-to-digital converter (A/D conversion element 41-1-41-15 of fig 6) for converting the image signal that is multiplexed by the multiplexer (43-2 of fig 5) into a digital signal (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal)

Although Yushiya teaches how a control unit 44 of fig 7, generate a control signal to control a switching elements in response to external signal clock signal, as shown in 6, and as discussed above), Yushiya fails to teach a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

Yumiba et al. (359), in the same area of image scanning apparatus, (as shown in fig 1) teaches a control unit (correction circuit 9 of fig 1) that controls the plurality of image sensor (R, G, B sensor 5a, 5b and 5c of fig 2) switching elements to simultaneously output the image signals from the predetermined number of

photoelectric conversion elements (R, G, B sensor 5a, 5b and 5c of fig 2) in one of the plural groups (plurality of image sensor 5a, 5b, 5c, r, g, b signals simultaneously output from sensors the RGB sensor corresponds to the different lines 1a, 1b and 1c of the original, col.4, lines 25-30).

Therefore, it would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified the imaging apparatus of Yushiya (129) to include: a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, It would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified imaging device of Yushiya by the teaching of Yumiba et al. (359) for the purpose of obtaining a perfect final image, for all the prints of different color to be exactly superimposed by controlling the output of plurality image sensors (RGB colors) at same time, instead of sequentially which affect the quality of the outputted image due to noise crated by each image sensor during lengthy operation.

With respect to claim 12, Yoshiya teaches an image sensor (image sensor as shown in fig 6), wherein each of the signal output lines is provided with an analog amplifier for amplifying the image signal transferred from the corresponding one of the photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) through the corresponding one of the switching elements (43-1, 43-2 of fig 7).

With respect to claim 13, Yoshiya teaches an image sensor (image sensor as shown in fig 6) comprising: a plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) arranged in a main scanning direction, (col.5, lines 20-30) each of the plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) generating an analog image signal corresponding to an amount of incident light thereon, (analog digital conversion is generated by A/D 41-1 through 41-15 the, which is a plurality of conversion element) plurality of photoelectric conversion elements (plurality of A/D conversion element 41-1-41-15 of fig 6) being divided into plural groups, each of the plural groups including a predetermined number (N) of the photoelectric conversion elements (the conversion elements are predetermined in a number group elements, A/D conversion element 41-1-41-15 of fig 6); a plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) connected to respective ones of the plurality of photoelectric conversion elements, (col.4, lines 57-65) individually; and

a control unit (control signal generation circuit 44 of fig 7, serves as a driving means for generating each of the control signal, col.5, lines 12-15) that controls the plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) in response to an external clock signal (a master clock pulse signal MCLK, col.5, lines 12-16) to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of

the plural groups, (various line sensor 2-1, 2-2.., and 2-15, simultaneously stars the operation, to out put image signal, as discussed in col.5, lines 21-25),

and signal output lines with a number equal to N, wherein the predetermined number of photoelectric conversion elements (plurality image sensor (various line sensor 2-1, 2-2.., and 2-15, as discussed in col.5, lines 21-25), in each of the plural groups are connectable with the respective ones of the signal output lines through the switching elements, (switch elements 43-1, 43-2, .., and 43-15, col.5, lines 5-10) individually, to output the image signals from the predetermined number of photoelectric conversion elements (various line sensor 2-1, 2-2.., and 2-15, to out put image signal, as discussed in col.5, lines 20-26), to the signal output lines; a multiplexer (circuit 44 of fig 6) connected to the signal output lines of the image sensor(sensor 2-1, 2-2.., and 2-15 of fig 6), for multiplexing the image signals transferred through the signal output lines; ; a sample-and-hold circuit (sample hold circuit 40-1, 40-2, ---40-15 of fig 18) connected to the signal output lines of the image sensor (various line sensor 2-1, 2-2.., and 2-15 of fig 6) for temporarily storing the image signals transferred from the photoelectric conversion elements (line sensor 2-1, 2-2.., and 2-15 of fig 6) in one group though the corresponding ones of the switching elements and the signal output lines; a multiplexer (45 of fig 18) for multiplexing the image signal stored temporarily in the sample-and-hold circuit (40-1.. 40-15 of fig 18); and an analog-to-digital converter (A/D conversion element 41-1-41-15 of fig 6) for converting the image signal that is multiplexed by the multiplexer (43-2 of fig 5) into a digital signal (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal),

Although Yushiya teaches how a control unit 44 of fig 7, generate a control signal to control a switching elements in response to external signal clock signal, as shown in 6, and as discussed above), Yushiya fails to teach a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

Yumiba et al. (359), in the same area of image scanning apparatus, (as shown in fig 1) teaches a control unit (correction circuit 9 of fig 1) that controls the plurality of image sensor (R, G, B sensor 5a, 5b and 5c of fig 2) switching elements to simultaneously output the image signals from the predetermined number of photoelectric conversion elements (R, G, B sensor 5a, 5b and 5c of fig 2) in one of the plural groups (plurality of image sensor 5a, 5b, 5c, r, g, b signals simultaneously output from sensors the RGB sensor corresponds to the different lines 1a, 1b and 1c of the original, col.4, lines 25-30).

Therefore, it would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified the imaging apparatus of Yushiya (129) to include: a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, It would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified imaging device of Yushiya by the teaching of Yumiba et al. (359) for the purpose of obtaining a perfect final image, for all the prints of

different color to be exactly superimposed by controlling the output of plurality image sensors (RGB colors) at same time, instead of sequentially which affect the quality of the outputted image due to noise crated by each image sensor during lengthy operation.

With respect to claim 14, Yoshiya teaches an image sensor (image sensor as shown in fig 6), wherein each of the signal output lines (Dout of fig 7) is provided with an analog amplifier for amplifying the image signal transferred from the corresponding one of the photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) through the corresponding one of the switching elements (43-1, 43-2 of fig 7).

With respect to claim 15, Yoshiya teaches an image sensor (image sensor as shown in fig 6) comprising: a plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) arranged in a main scanning direction, (col.5, lines 20-30) each of the plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) generating an analog image signal corresponding to an amount of incident light thereon, (analog digital conversion is generated by A/D 41-1 through 41-15 the, which is a plurality of conversion element) plurality of photoelectric conversion elements (plurality of A/D conversion element 41-1-41-15 of fig 6) being divided into plural groups, each of the plural groups including a predetermined number (N) of the photoelectric conversion elements (the conversion elements are

predetermined in a number group elements, A/D conversion element 41-1-41-15 of fig 6); a plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) connected to respective ones of the plurality of photoelectric conversion elements, (col.4, lines 57-65) individually; and

a control unit (control signal generation circuit 44 of fig 7, serves as a driving means for generating each of the control signal, col.5, lines 12-15) that controls the plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) in response to an external clock signal (a master clock pulse signal MCLK, col.5, lines 12-16) to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, (various line sensor 2-1, 2-2.., and 2-15, simultaneously stars the operation, to out put image signal, as discussed in col.5, lines 21-25),

and signal output lines with a number equal to N, wherein the predetermined number of photoelectric conversion elements (plurality image sensor (various line sensor 2-1, 2-2.., and 2-15, as discussed in col.5, lines 21-25), in each of the plural groups are connectable with the respective ones of the signal output lines through the switching elements, (switch elements 43-1, 43-2, .., and 43-15, col.5, lines 5-10) individually, to output the image signals from the predetermined number of photoelectric conversion elements (various line sensor 2-1, 2-2.., and 2-15, to out put image signal, as discussed in col.5, lines 20-26), to the signal output lines; a multiplexer (circuit 44 of fig 6) connected to the signal output lines of the image sensor(sensor 2-1, 2-2.., and 2-15 of fig 6), for multiplexing the image signals transferred through the signal output

lines; and an analog-to-digital converter (A/D conversion element 41-1-41-15 of fig 6) for converting the image signal that is multiplexed by the multiplexer (43-2 of fig 5) into a digital signal (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal)

Although Yushiya teaches how a control unit 44 of fig 7, generate a control signal to control a switching elements in response to external signal clock signal, as shown in 6, and as discussed above), Yushiya fails to teach a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

Yumiba et al. (359), in the same area of image scanning apparatus, (as shown in fig 1) teaches a control unit (correction circuit 9 of fig 1) that controls the plurality of image sensor (R, G, B sensor 5a, 5b and 5c of fig 2) switching elements to simultaneously output the image signals from the predetermined number of photoelectric conversion elements (R, G, B sensor 5a, 5b and 5c of fig 2) in one of the plural groups (plurality of image sensor 5a, 5b, 5c, r, g, b signals simultaneously output from sensors the RGB sensor corresponds to the different lines 1a, 1b and 1c of the original, col.4, lines 25-30).

Therefore, it would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified the imaging apparatus of Yushiya (129) to include: a control unit that controls the plurality of switching elements in

response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

It would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified imaging device of Yushiya by the teaching of Yumiba et al. (359) for the purpose of obtaining a perfect final image, for all the prints of different color to be exactly superimposed by controlling the output of plurality image sensors (RGB colors) at same time, instead of sequentially which affect the quality of the outputted image due to noise crated by each image sensor during lengthy operation.

With respect to claim 16, Yoshiya teaches an image sensor (image sensor as shown in fig 6) comprising: a plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) arranged in a main scanning direction, (col.5, lines 20-30) each of the plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) generating an analog image signal corresponding to an amount of incident light thereon, (analog digital conversion is generated by A/D 41-1 through 41-15 the, which is a plurality of conversion element) plurality of photoelectric conversion elements (plurality of A/D conversion element 41-1-41-15 of fig 6) being divided into plural groups, each of the plural groups including a predetermined number (N) of the photoelectric conversion elements (the conversion elements are predetermined in a number group elements, A/D conversion element 41-1-41-15 of fig 6); a plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches

for controlling connection, col.5, lines 5-10) connected to respective ones of the plurality of photoelectric conversion elements, (col.4, lines 57-65) individually; and

a control unit (control signal generation circuit 44 of fig 7, serves as a driving means for generating each of the control signal, col.5, lines 12-15) that controls the plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) in response to an external clock signal (a master clock pulse signal MCLK, col.5, lines 12-16) to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, (various line sensor 2-1, 2-2.., and 2-15, simultaneously stars the operation, to out put image signal, as discussed in col.5, lines 21-25),

and signal output lines with a number equal to N, wherein the predetermined number of photoelectric conversion elements (plurality image sensor (various line sensor 2-1, 2-2.., and 2-15, as discussed in col.5, lines 21-25), in each of the plural groups are connectable with the respective ones of the signal output lines through the switching elements, (switch elements 43-1, 43-2, .., and 43-15, col.5, lines 5-10) individually, to output the image signals from the predetermined number of photoelectric conversion elements (various line sensor 2-1, 2-2.., and 2-15, to out put image signal, as discussed in col.5, lines 20-26), to the signal output lines; a multiplexer (circuit 44 of fig 6) connected to the signal output lines of the image sensor (sensor 2-1, 2-2.., and 2-15 of fig 6), for multiplexing the image signals transferred through the signal output lines; and an analog-to-digital converter (A/D conversion element 41-1-41-15 of fig 6) for converting the image signal that is multiplexed by the multiplexer (43-2 of fig 5) into a

digital signal (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal), an analog front-end IC (36-1, 36-2 of fig 6) that includes; an analog amplifier (41-1, 41-2 of fig 7) for amplifying an analog input signal received through one of a plurality of channels (Vout 1, Vout 2 of fig 1); a multiplexer for multiplexing the analog input signal amplified by the analog amplifier (41-1 of fig 6); and an analog-to-digital converter (41-15 of fig 7) for converting the analog input signal of each channel that is multiplexed by the multiplexer into a digital signal (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal), an analog front-end IC (36-1, 36-2 of fig 6); wherein the signal output lines function as the plurality of channels of the analog front-end IC, and the analog front-end IC (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal), an analog front-end IC (36-1, 36-2 of fig 6) is connected to the image sensor (sensor 2-1, 2-2.., and 2-15 of fig 6) so that the analog front-end IC receives the image signal transferred from each of the photoelectric conversion elements through the corresponding one of the signal output lines as the analog input signal. elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6).

Although Yushiya teaches how a control unit 44 of fig 7, generate a control signal to control a switching elements in response to external signal clock signal, as shown in 6, and as discussed above), Yushiya fails to teach a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

Yumiba et al. (359), in the same area of image scanning apparatus, (as shown in fig 1) teaches a control unit (correction circuit 9 of fig 1) that controls the plurality of image sensor (R, G, B sensor 5a, 5b and 5c of fig 2) switching elements to simultaneously output the image signals from the predetermined number of photoelectric conversion elements (R, G, B sensor 5a, 5b and 5c of fig 2) in one of the plural groups (plurality of image sensor 5a, 5b, 5c, r, g, b signals simultaneously output from sensors the RGB sensor corresponds to the different lines 1a, 1b and 1c of the original, col.4, lines 25-30).

Therefore, it would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified the imaging apparatus of Yushiya (129) to include: a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, It would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified imaging device of Yushiya by the teaching of Yumiba et al. (359) for the purpose of obtaining a perfect final image, for all the prints of different color to be exactly superimposed by controlling the output of plurality image sensors (RGB colors) at same time, instead of sequentially which affect the quality of the outputted image due to noise crated by each image sensor during lengthy operation.

With respect to claim 17, Yoshiya teaches an image sensor (image sensor as shown in fig 6), wherein each of the signal output lines is provided with an analog

amplifier for amplifying the image signal transferred from each of the photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) through the corresponding one of the switching elements (43-1, 43-2 of fig 7).

With respect to claim 18, Yoshiya teaches an image sensor (image sensor as shown in fig 6) comprising: a plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) arranged in a main scanning direction, (col.5, lines 20-30) each of the plurality of photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) generating an analog image signal corresponding to an amount of incident light thereon, (analog digital conversion is generated by A/D 41-1 through 41-15 the, which is a plurality of conversion element) plurality of photoelectric conversion elements (plurality of A/D conversion element 41-1-41-15 of fig 6) being divided into plural groups, each of the plural groups including a predetermined number (N) of the photoelectric conversion elements (the conversion elements are predetermined in a number group elements, A/D conversion element 41-1-41-15 of fig 6); a plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) connected to respective ones of the plurality of photoelectric conversion elements, (col.4, lines 57-65) individually; and

a control unit (control signal generation circuit 44 of fig 7, serves as a driving means for generating each of the control signal, col.5, lines 12-15) that controls the

plurality of switching elements (switch elements 43-1, 43-2, .., and 43-15, switches for controlling connection, col.5, lines 5-10) in response to an external clock signal (a master clock pulse signal MCLK, col.5, lines 12-16) to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups, (various line sensor 2-1, 2-2.., and 2-15, simultaneously stars the operation, to out put image signal, as discussed in col.5, lines 21-25),

and signal output lines with a number equal to N, wherein the predetermined number of photoelectric conversion elements (plurality image sensor (various line sensor 2-1, 2-2.., and 2-15, as discussed in col.5, lines 21-25), in each of the plural groups are connectable with the respective ones of the signal output lines through the switching elements, (switch elements 43-1, 43-2, .., and 43-15, col.5, lines 5-10) individually, to output the image signals from the predetermined number of photoelectric conversion elements (various line sensor 2-1, 2-2.., and 2-15, to out put image signal, as discussed in col.5, lines 20-26), to the signal output lines; a multiplexer (circuit 44 of fig 6) connected to the signal output lines of the image sensor(sensor 2-1, 2-2.., and 2-15 of fig 6), for multiplexing the image signals transferred through the signal output lines; and an analog-to-digital converter (A/D conversion element 41-1-41-15 of fig 6) for converting the image signal that is multiplexed by the multiplexer (43-2 of fig 5) into a digital signal (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal) an analog-to-digital converter connected to the signal output terminal of the multiplexer for converting the analog image signal supplied sequentially from the multiplexer into a digital signal; and resolution switching unit that select one of a high

resolution mode in which all the image signals from the photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) that belong to each of the groups are supplied sequentially to the analog-to-digital converter elements (a plurality line image (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal) and a low resolution mode in which the image signals are thinned out and then supplied to the analog-to-digital converter (A/D conversion circuit 43-2 of fig 5, for converting analog signal to digital signal) r.

Although Yushiya teaches how a control unit 44 of fig 7, generate a control signal to control a switching elements in response to external signal clock signal, as shown in 6, and as discussed above), Yushiya fails to teach a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

Yumiba et al. (359), in the same area of image scanning apparatus, (as shown in fig 1) teaches a control unit (correction circuit 9 of fig 1) that controls the plurality of image sensor (R, G, B sensor 5a, 5b and 5c of fig 2) switching elements to simultaneously output the image signals from the predetermined number of photoelectric conversion elements (R, G, B sensor 5a, 5b and 5c of fig 2) in one of the plural groups (plurality of image sensor 5a, 5b, 5c, r, g, b signals simultaneously output from sensors the RGB sensor corresponds to the different lines 1a, 1b and 1c of the original, col.4, lines 25-30).

Therefore, it would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified the imaging apparatus of Yushiya (129) to include: a control unit that controls the plurality of switching elements in response to an external clock signal to simultaneously output the image signals from the predetermined number of photoelectric conversion elements in one of the plural groups,

It would have been obvious to a person with ordinary skill in the art at the time the invention was made to have modified imaging device of Yushiya by the teaching of Yumiba et al. (359) for the purpose of obtaining a perfect final image, for all the prints of different color to be exactly superimposed by controlling the output of plurality image sensors (RGB colors) at same time, instead of sequentially which affect the quality of the outputted image due to noise crated by each image sensor during lengthy operation.

With respect to claim 19, Yoshiya teaches an image sensor (image sensor as shown in fig 6), wherein the resolution switching unit (43-1, 43-2 of fig 7) is configured to supply the image signals received from only one of the signal input terminals to the analog-to-digital converter, (A/D converter 41-1, 41-2 of fig 7) when the low resolution mode is selected.

With respect to claim 20, Yoshiya teaches an image sensor (image sensor as shown in fig 6), wherein the resolution switching unit (43-1 of fig 7) is configured to select the signal input terminals among all the signal input terminals to supply the image signal from the selected signal input terminals to the analog-to-digital converter (A/D

converter 41-1, 42-2 of fig 7) by switching the selected signal input terminals time-sequentially when the low resolution mode is selected.

With respect to claim 21, Yoshiya teaches an image sensor (image sensor as shown in fig 6), further comprising an averaging circuit (45 of fig 18) for averaging the image signals selected among the image signals received from the plural photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) that belong to one of the groups, wherein the resolution switching unit (35-2 of fig 6) selects another low resolution mode in which the averaging circuit is used to lower the resolution of the image in addition to the high and low resolution modes, wherein an output signal of the averaging circuit is supplied to the analog-to-digital converter 9A/D converter 41-1 of fig 6) when the another low resolution mode is selected.

With respect to claim 22, Yoshiya teaches an image sensor (image sensor as shown in fig 6), wherein the averaging circuit (45 of fig 7) is configured to average all the signals received from the photoelectric conversion elements (a plurality line image sensor 2-1, 2-2, ...2-15 of fig 6, arranged horizontally, as shown fig 6) that belong to one of the groups and to supply the averaged signal to the analog-to-digital converter (A/D converter 41-1, 41-2 of fig 6).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure of claims 1-22.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Negussie Worku whose telephone number is 571-272-7472. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Aung Moe can be reached on 571-272-7314. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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